CLEEN (Continuous Lower Energy, Emissions and Noise) Program Technologies Development

Federal Aviation Administration

Presented to: NASA ERA N+2 Advanced Vehicle Concepts & Quck-Starts NRA Pre-Proposal Meeting

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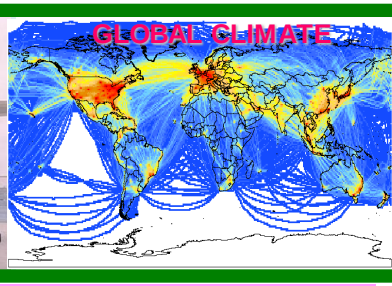
Next Generation Air Transportation System (NextGen)

Ongoing, wide-ranging transformation of U.S. national airspace system (NAS)

Meeting NextGen Environmental Challenges

NextGen goal to increase capacity is dependent upon addressing & mitigating aviation environmental impacts & dealing with related energy issues



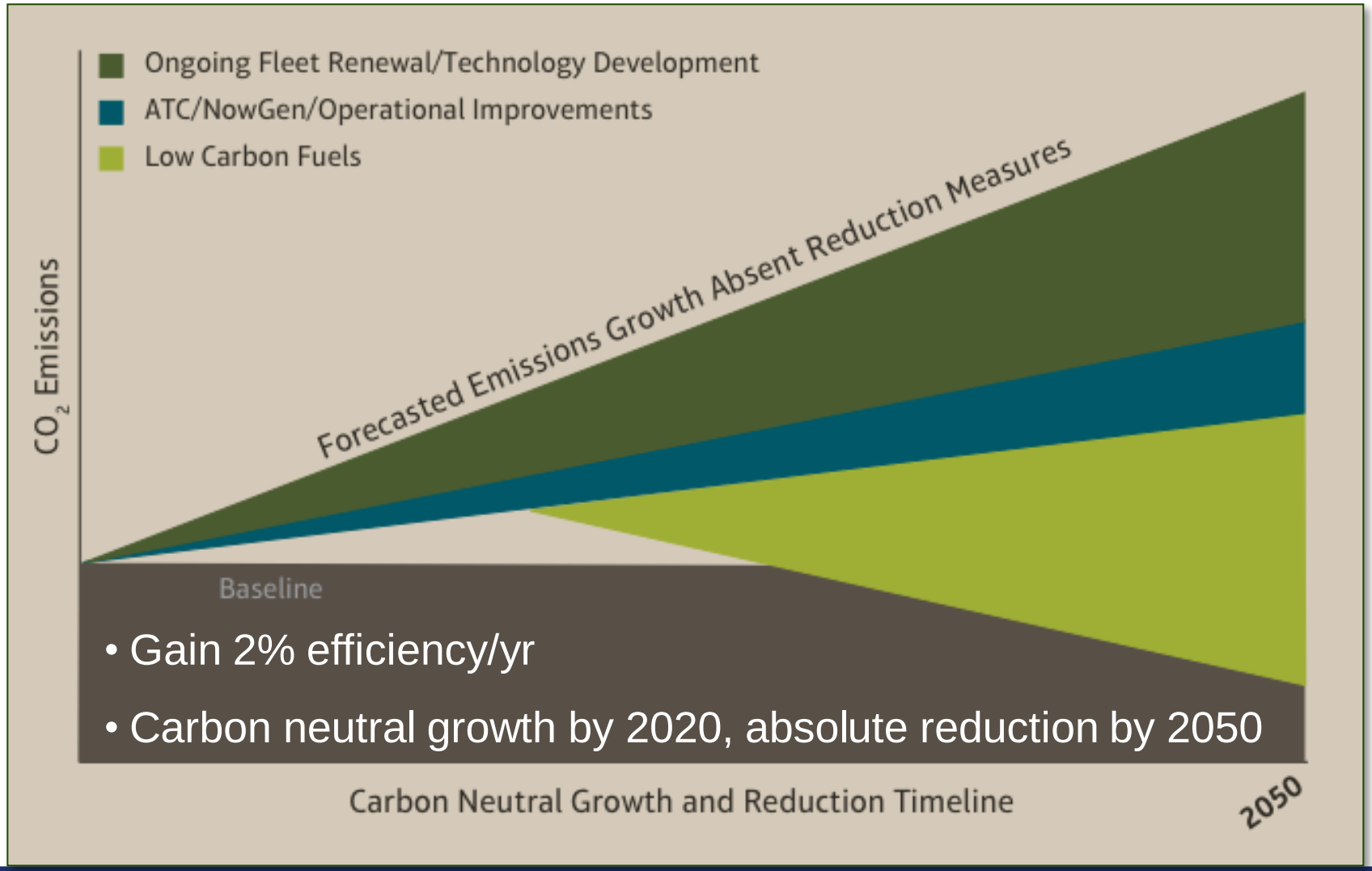
NextGen environmental goals

- Absolute reduction of significant ***community noise*** and ***air quality*** emissions impacts
- Reduce significant aviation impacts associated with ***water quality***
- Improve NAS ***energy*** efficiency and, supply of and access to, alternative fuel sources
- Limit/reduce the impact of aviation greenhouse gas (GHG) emissions on the ***global climate***

5-Pillar approach to develop solutions

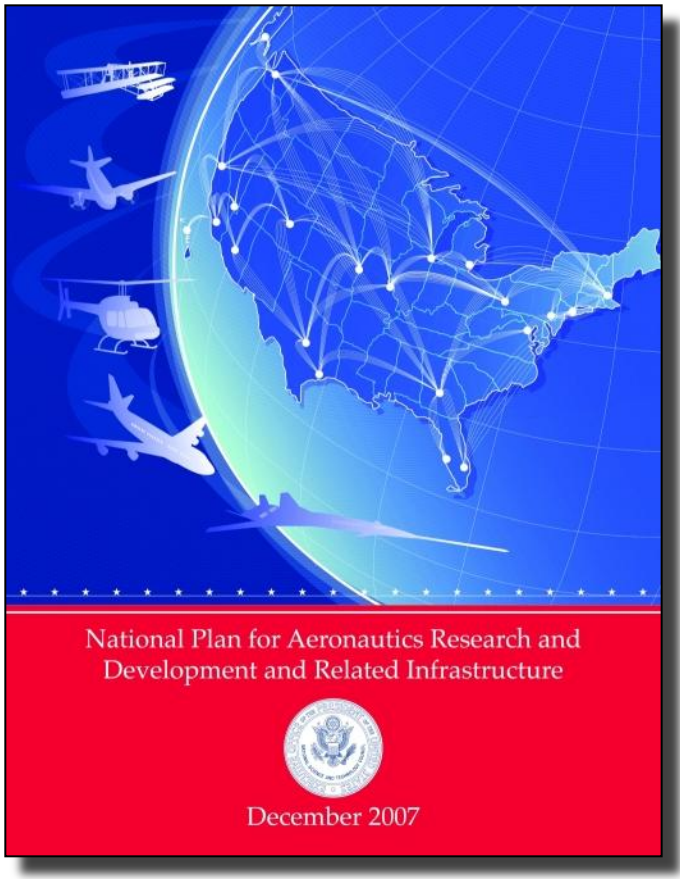
1. Improve science and modeling
2. Accelerate operational changes
3. Mature new aircraft technology
4. Develop renewable fuels
5. Examine policies & market-based measures

Sample Plan for Success (CO_2)



FAA CLEEN Program

- Address NextGen environmental goals in partnership with industry
- Develop & Demonstrate certifiable aircraft/engine tech
- Advance renewable alternative fuels for aviation
- Assess technology suitability for retrofit or re-engine
- Meet national R&D goals



CLEEN Program Goals

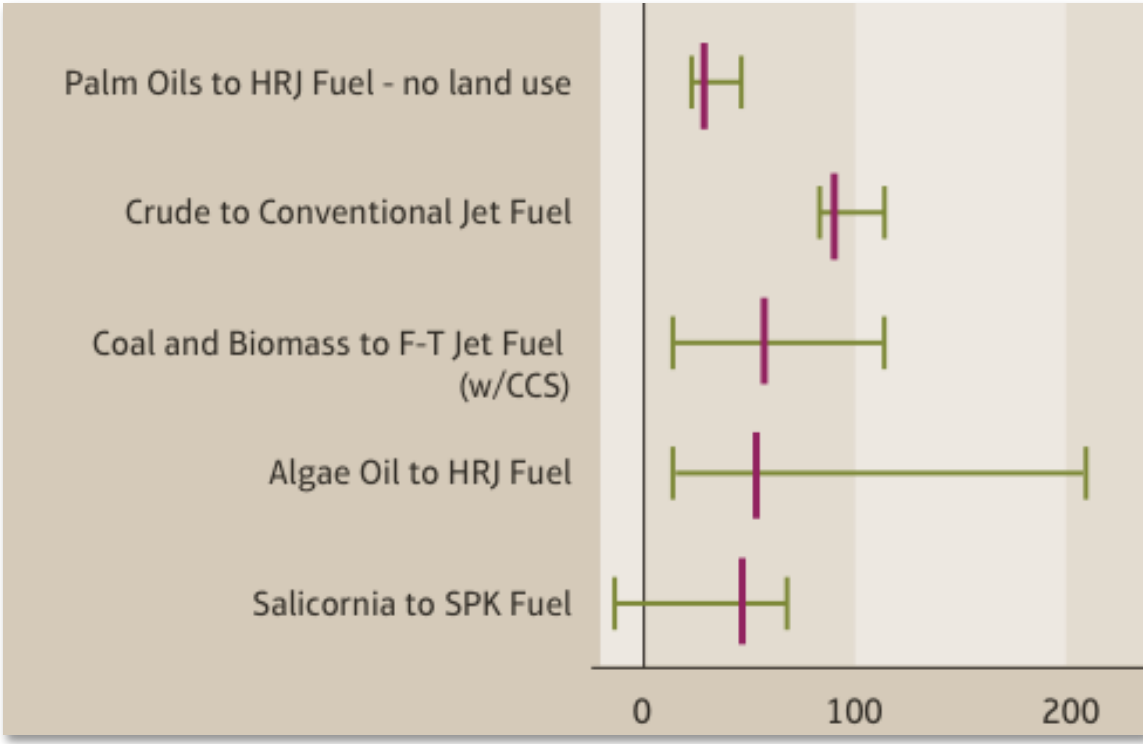
Develop & demo (TRL 6-7) certifiable aircraft/engine technology

	N+1 (2015) CONVENTIONAL CONFIGURATION RELATIVE TO 1998	N+2 (2020-25) UNCONVENTIONAL CONFIGURATION RELATIVE TO 1998	N+3 (2030-35) ADVANCED CONCEPTS RELATIVE TO 2005
NOISE	-32 dB cum below Stage 4	-42 dB cum below Stage 4	-71 dB cum below Stage 4
LTO NOX EMISSIONS (BELOW CAEP 6)	-60%	-75%	better than -75%
AIRCRAFT FUEL BURN	-33%	-50%	better than -70%

CLEEN Program Goals (continued)

Advance use of “drop-in” alternative fuels in aircraft systems focusing on renewable options

- No compromise in safety
- Successful demonstration
- Quantification of environmental impacts, costs and benefits



CLEEN Timeframe and Funding

- Timeframe: Fiscal Year 2009-2014+
- Budget
  - $125M+ for FY-09 through FY-14*
  - Minimum 1:1 Cost Share
- Market Research Conference: May 2008
- Solicitation released: May 12, 2009.
- Solicitation closed: July 21.
- Proposal Evaluation Completed, Awards Pending

Accomplished with support from NASA and AFRL

*** Per 2009 FAA National Aviation Research Plan and FY 2010 Budget Request**

Way Forward

- **Contract awards in 1st Qtr of CY 2010**
- **CLEEN Consortium Kick-off Summer 2010**
- **Development of CLEEN technology transition roadmaps**

Questions?

CLEEN Consortium Goals

- **Facilitate cooperation among awardees**
- **Spur technical interchange**
- **Provide mechanism for effective government-industry collaboration**
- **Accelerate technology transition to commercial products**
- **Provide vehicle to more effectively identify & address technology gaps**